REMARKS

In the Office Action dated April 22, 2003, claims 11-30 are pending and all claims are rejected. The above amendment is submitted to more particularly point out and distinctly claim the subject matter regarded as invention.

Applicants wish to inform the Examiner that patents have been granted on the corresponding applications in Germany (DE 199 28 840 C1; copy of cover sheet attached hereto) and the European Patent Office (copy of notice attached hereto).

The specification has been amended to correct the specification with respect to the shank-end tool of the present invention. Specifically, the shank-end tool of the present invention has a cutter blade as an insert fixedly attached in a groove in the shank. The cutter blade has a flat leading face in a direction of advance during use, and has no cutting edge on the leading face. See, also, English abstract of WO 01/00351 A1, the publication of the present international application from which this application derives. The use of the terminology "wear resistant blade edge" was meant to describe the use of wear resistant material on the leading face of the cutting tool (see, e.g., reference number 15 in FIG. 1). There was no intention to limit the scope of the invention as expressed in the international application. The errors now corrected were dur to an initial misunderstanding.

The cutter blade configuration of the present invention allows for high speed machining of sand molds without forming chips or splinters. Thus, filigree casting molds that have a very

smooth mold surface can be manufactured using foundry sand with the presently described and claimed shank-end tools.

As described in US Published Application No. 20010001893, it is known to use cutting tools such as drills or milling tools to produce sand molds from blocks of green sand formed with a bonding agent. These cutting tools have **cutting edges**. When using such cutting tools with cutting edges during production of sand molds, chips or splinters are formed from the compressed sand. Further, machining the sand block with high speed milling using such cutting tools can provide large quantites of waste sand which destroy any fine detasils in the milled sand block. In addition, it is known that the life span of tools is shortened when higher firmness sand blosks are used.

Gustafson, U.S. 6,286,581, teaches cutting tools for sand molds where the cutting edge comprises carbide material or diamond in order to provide longer wear. However, such tools are more expensive to produce. Because of the high wear conditions when machining sand blocks to make sand molds, even these cutting tools wear relatively quickly. Thus, these methods result in high costs for machining sand molds.

Contrary to the prior art methods, the shank tool of the present invention has no cutting edge. Thus, during high speed milling, no chips or splinters of the sand block develop. With the shank tool without cutting edges of the present invention, no chips or splinters can develop from maching the sand block. Instead, a powdery sand waste is produced that does not destroy

filigree. No diamond or carbide material is required for the cutting edges to provide longer wear because the cutting tools of the present invention due not use have cutting egdes.

Further, cutting tools with cutting edges cannot produce the powdery sand waste that avoids destroying filigree.

The tools of the present invention are made inexpensively and can be readily replaced as they wear. Thus, the cutting tools of the present invention without cutting edges can provide significantly lower costs in producing sand molds. further costs are reduced by saving the filigree in the sand mold and not having to machine the filigree into the molded metal part.

Claims 11-15, 18, 19, 21-25, 28 and 29 are rejected under 35 U.S.C. §102(b) over Williams (U.S. 2,621,548). Williams is directed to a mounting for cutting tools. As such, there is little descriptioin of the edges of the cutting tools. Yet, Williams does teach that the cutting tools have cutting edges (see, e.g., col. 2, line 51; col. 3, line 15; etc.). It is well knwon to those skilled in the art that a cutting edge is formed where the plane of the end surface of the tool makes an acute angle with the plane of leading cutting surface of the tool. This is most easily seen in Fig. 16 of Williams.

In the present invention, the cutting tool has a non-cutting edge. In other words, the plane of the blade edge of the tool forms essentially a right angle with the plane of the leading cutting face of the tool. As such the tool does not actually cut the sand mold but, instead,

Thus, Williams does not teach or suggest a cutting tool having a non-cutting edge. It is not seen how one of ordinary skill in the art would have made a cutting tool with a non-cutting edge based on any teachings of Williams.

Williams discloses the use of high speed tool steel for making the cutting tool. The term "high speed" as used in "high speed tool steel" has no agreement with the term "high speed" as used in "high speed cutting" or "high speed milling." "High speed cutting" or "high speed milling" is a term well known in the art and conveys that the tool rpm is at least 15,000 up to 40,000. High speed tool steel is a common material is used typically at about 5000 rpm. Enclosed is a data sheet of Melin Tool showing recommended rpm for end mills made of cobalt high speed steel and common high speed steel. Thus, the cutting tool of Williams is not suitable for high speed milling of sand molds.

Regarding the method claims for a method for the milling-type machining of chipless materials for the manufacture of heat-resistant sand molds, Williams is totally silent about the production of sand molds. Thus, it is not seen how one of ordinary skill in the art would have performed the presently claimed methods based on any teachings of Williams. There is no inherent teachiong of the presently claimed methods in Williams.

Further, with respect to claims 12 and 22, there is no suggestion in Williams that the flat leading face of the cutter blade is more wear resistant then the rear side of the cutter blade.

Thus, it is not seen how the present invention is anticipated, or would have been obvious to one of ordinary skill in the art in view of, Williams.

Claims 16 and 26 are rejected under 35 U.S.C. §103(a) over Williams in view of Schweikert et al. (U.S. 5,222,842). Williams is discussed in detail above. Schweikert ***fails*** to make up for the deficiencies of Williams.

Schweikert describes a milling tool having cutting edges and arched areas on the cutting edge carriers. The cutting tool is not located in a groove at the end of the tool shaft.

There is not even a hint of a suggestion in Schweikert for a cutting tool **without cutting edges**, i.e., having non-cutting edges. Nor is there any suggestion for using a tool to produce sand molds.

Thus, it is not seen how the present invention would have been obvious to one of ordinary skill in the art in view of any combination of Williams and Schweikert.

Claims 17 and 27 are rejected under 35 U.S.C. §103(a) over Williams in view of Ogawa (U.S. 5,597,269). Williams is discussed in detail above. Ogawa ***fails*** to make up for the deficiencies of Williams.

Ogawa describes a cutting tool for a honeycomb core having a plurality of spiral blades. Each blade has a cutting edge with a specified lip angle.

There is not even a hint of a suggestion in Ogawa for a cutting tool **without cutting edges**, i.e., having non-cutting edges. Nor is there any suggestion for using a tool to produce sand molds.

Thus, it is not seen how the present invention would have been obvious to one of ordinary skill in the art in view of any combination of Williams and Ogawa.

Claims 20 and 30 are rejected under 35 U.S.C. §103(a) over Williams in view of Freitag (U.S. 3,540,315). Williams is discussed in detail above. Freitag ***fails*** to make up for the deficiencies of Williams.

Freitag describes a cutter for maching soft plastic material such as styrofoam. The cutter has cutting edges 70, 72 (see col. 3, line 52; Fig 7).

There is not even a hint of a suggestion in Freitag for a cutting tool **without cutting edges**, i.e., having non-cutting edges. Nor is there any suggestion for using a tool to produce sand molds.

Thus, it is not seen how the present invention would have been obvious to one of ordinary skill in the art in view of any combination of Williams and Freitag.

Other references made of record by the examiner are not relied on and are not considered relevant. None of those references teach or suggest a cutting tool **without cutting edges** or a the presently claimed methods for the milling-type machining of chipless materials for the manufacture of heat-resistant sand molds.

In view of the discussion above, it is respectfully submitted that the present application is in condition for allowance. An early reconsideration and notice of allowance are earnestly solicited. Please charge any additional necessary fee to Deposit Account No.: 04-1105.

Respectfully submitted,

DATE: 18 July '03

George W. Neuner (Reg. No. 26,964)

EDWARDS & ANGELL, LLP
101 Federal Street
P.O. Box 9169
Boston, MA 02209

Tel: (617) 517-5538